

REMARKS/ARGUMENTS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1, 2, 4-6, 8, 9, 11-16, and 18-21 are currently pending in the above-identified application. Claims 1, 4, 5, 8, 9, 11, and 15 are amended, and new claims 18-21 are added, by the foregoing amendment. Independent claims 1, 5, 9, and 15 are amended to incorporate features of originally-filed dependent claims. Claims 4, 8, 10, and 17 are amended to adjust claim dependency, to address informalities, and to remove a redundancy with respect to independent claims 1, 5, 9, and 15, respectively. New claims 18-21 are supported in Applicants' originally-filed disclosure at least at page 10, Table 1, Experiment Number 8. No new subject matter is introduced by these claim changes.

In the Office Action, Claims 1 and 2 were rejected under 35 U.S.C. § 102(b) as anticipated by Hisano et al. (U.S. Patent No. 5,198,889; hereinafter "Hisano"). Claim 5 was rejected under 35 U.S.C. § 102(b) as anticipated by Itoh (U.S. Patent No. 5,396,947). Claims 3 and 4 were rejected under 35 U.S.C. § 103(a) as unpatentable over Hisano in view of Murase et al. (U.S. Patent No. 4,982,274; hereinafter "Murase"). Claims 6, 9, 16, and 16 were rejected under 35 U.S.C. § 103(a) as unpatentable over Itoh in view of Hisano. Claims 7, 8, 10, 11, and 17 were rejected under 35 U.S.C. § 103(a) as unpatentable over Itoh in view of Hisano and further in view of Murase. Claims 13 and 14 were rejected under 35 U.S.C. § 103(a) as unpatentable over Itoh in view of Hisano and further in view of Gammel et al. (U.S. Patent No. 3,834,454).

Regarding the rejection of claims 1 and 2 under 35 U.S.C. § 102(b), Applicants respectfully submit that amended claim 1 is not anticipated by Hisano. For example, amended claim 1 recites, among other features, "a tank including a pipe of circular cross section, said pipe being provided with a groove on an inner surface thereof, and said groove

being inclined at an angle  $\theta$  of less than  $90^\circ$  relative to an axial direction of said tank and having a pitch of 4 mm or less in the axial direction of said tank." Referring to the non-limiting example shown in Applicants' Figure 5, a tank 2 includes a pipe of circular cross section, the pipe being provided with grooves 8. The grooves 8 are positioned relative to the longitudinal axis of the tank 2 at an angle  $\theta$  and have a pitch  $p$  (i.e., the distance between each groove 8 along the longitudinal axis of the tank 2 is a distance " $p$ ").

As correctly acknowledged in numbered paragraph 5 of the Office Action, Hisano fails to disclose a tank including a pipe of circular cross-section, the pipe being provided with a groove on an inner surface thereof. As Hisano does not teach each and every feature of amended claim 1, Hisano fails to anticipate amended claim 1.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 1 and dependent claim 2 under 35 U.S.C. § 102(b). Further, claims 4 and 18 depend from independent claim 1 and are patentable for at least the reasons discussed above. Further, there is no suggestion in the prior art to modify the teachings of Hisano to arrive at the features of amended claim 1 and, therefore, it is respectfully submitted that the prior art also fails to render obvious the present invention.

Regarding the rejection of claim 5 under 35 U.S.C. § 102(b), Applicants respectfully submit that Itoh fails to disclose each and every feature of amended claim 5. For example, amended claim 5 recites, among other features, "a tank including a pipe of circular cross section, said pipe being provided with a groove on an inner surface thereof, and said groove being inclined at an angle  $\theta$  of less than  $90^\circ$  relative to an axial direction of said tank and having a pitch of 4 mm or less in the axial direction of said tank."

As correctly acknowledged in numbered paragraph 10 of the Office Action, Itoh fails to disclose a tank including a pipe of circular cross-section, the pipe being provided with a

groove on an inner surface thereof. Because Itoh fails to disclose each and every feature of amended claim 5, Itoh fails to anticipate amended claim 5.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 5 under 35 U.S.C. § 102(b). Further, claims 6, 8, 12, and 19 depend from independent claim 5 and are patentable for at least the reasons discussed above. Further, there is no suggestion in the prior art to modify the teachings of Itoh to arrive at the features of amended claim 5 and, therefore, it is respectfully submitted that the prior art also fails to render obvious the present invention.

Regarding the rejection of independent claims 9 and 15 under 35 U.S.C. § 103(a), Applicants respectfully submit that the suggested combination of Itoh and Hisano fails to disclose or teach amended claims 9 and 15. For example, amended claims 9 and 15 both recite, among other features, a tank including:

...a pipe of circular cross section, said pipe being provided with a groove on an inner surface thereof, and said groove being inclined at an angle  $\theta$  of less than  $90^\circ$  relative to an axial direction of said tank and having a pitch of 4 mm or less in the axial direction of said tank....

As correctly acknowledged in numbered paragraph 10 of the Office Action, Itoh and Hisano fail to disclose a tank including a pipe of circular cross-section, the pipe being provided with a groove on an inner surface thereof.

As such, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 9 and 15 under 35 U.S.C. § 103(a). Claims 11, 12, 14, and 20 depend from independent claim 9 and are patentable for at least the reasons discussed above. Claims 16 and 21 depend from independent claim 15 and are patentable for at least the reasons discussed above.

The Office Action looks to the teachings of Murase to address the subject matter of now-canceled claims 10 and 17, the features of which are incorporated into amended claims 9 and 15, respectively, by the foregoing amendment. However, a combination of Itoh, Hisano,

and Murase would not teach or disclose amended claims 9 and 15. Further, it would not have been obvious to one of ordinary skill in the art at the time of Applicants' invention to make such a combination.

For example, Murase discloses a metal pipe 11 including V-shaped linear grooves 12 formed on the inner surface of the pipe 11.<sup>1</sup> Each of the grooves 12 is positioned relative to the longitudinal axis of the pipe 11 at an angle  $\alpha$ , which is preferably "2-10° and more preferably 3-7."<sup>2</sup> The grooves 12 have "a pitch of 0.6 mm in the circumferential direction," as shown in Figure 2F of Murase.

However, Murase does not disclose a tank "including a pipe of circular cross section, said pipe being provided with a groove on an inner surface thereof," as recited in amended claims 9 and 15. In fact, Murase is completely silent as to a tank that is joined to a plurality of pipes, in contrast to amended claim 9, for example, which recites, "a plurality of pipes provided upstanding on and joined to a side of each of said tanks to be in communication with a corresponding one of said tanks." Rather, each pipe 11 is connected to a single pipe 17, which does not correspond to Applicants' claimed tank, which is connected to a plurality of pipes. Because Murase does not disclose a tank that includes a pipe of circular cross section and formed with an inner surface groove, Murase fails to remedy the deficiencies of Itoh and Hisano with respect to amended claims 9 and 15.

In addition, Applicants respectfully submit that it would not have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify a combination of Itoh and Hisano with the teachings of Murase. Specifically, each of Itoh and Hisano discloses the use of column pipes with fin attachments, the column pipes being in fluid communication with a bottom containing portion.<sup>3</sup> Murase, as shown in Figures 2A and 2F,

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<sup>1</sup> See Murase at Figure 2F and column 3, lines 20-24.

<sup>2</sup> Id. at column 3, lines 26 and 27.

<sup>3</sup> See, e.g., Itoh at Figures 4 and 10; and Hisano at Figure 23.

discloses pipes 11, which are similar to the column pipes of Itoh and Hisano, having grooves 12 formed within, as described above.

Murase does not, however, disclose "at least one of said plurality of tanks including a pipe of circular cross-section, said pipe being provided with a groove on an inner surface thereof," as recited in amended claim 9. As discussed above, Murase instead depicts a pipe 11 having grooves 12. Therefore, an ordinarily-skilled artisan at the time of Applicants' invention familiar with Itoh and Hisano would not have looked to Murase to improve heat characteristics of a heat exchanger tank, because, for example, 1) the system described by Murase does not include a heat exchanger tank, and 2) the grooves disclosed in Murase are formed in column pipes. Regarding the second point, the pipes 11 of Murase perform a function of receiving vaporized working fluid, unlike a tank, which functions to store liquid working fluid. Thus, at best, one of ordinary skill in the art at the time of Applicants' invention would have consulted Murase to modify the characteristics of column pipes including fin attachments, not to modify the characteristics of a base tank.

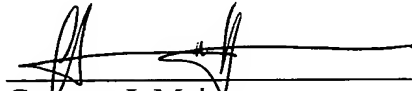
Thus, Murase provides no motivation to persons skilled in the art to provide a tank "including a pipe of circular cross section, said pipe being provided with a groove on an inner surface thereof," as recited in amended claims 9 and 15. Itoh and Hisano, both of which disclose smooth-surfaced base storage portions, certainly do not provide such motivation. Accordingly, in the absence of such motivation in the prior art references themselves, these prior art references would not be properly combinable under 35 U.S.C. §103, and amended claims 9 and 15 therefore patentably define thereover.

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Reply to Office Action of April 20, 2004

Consequently, in light of the above discussion and in view of the present amendment, the present application is believed to be in condition for allowance and an early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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